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ONION-RAISING:

WHAT KINDS TO RAISE, AND THE
WAY TO RAISE THEM.

NINETEENTH EDITION (REVISED).

JAMES J. ^{du}Howard H. GREGORY,

SEED-GROWER, MARBLEHEAD, MASS.



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ONION-RAISING.

WHY I WRITE THIS TREATISE.

IN COMMON with my fellow-seedsmen, I frequently receive letters from my farmer-friends, in different parts of the United States, asking for information on onion-raising. It is impossible in a letter-sheet to give sufficient minuteness of detail. I therefore send out this little treatise, in which I have endeavored to cover very minutely the whole ground of inquiry. I trust that it will prove acceptable.

SELECTING THE SOIL.

UNTIL WITHIN the last score of years, onions were an exception to the general rule, and did better on land on which they had been raised for successive years.

I once examined an acre of land which had been planted continuously with onions for three generations, without perceptible decrease in the quantity or quality of the crop.

Of late we find, that, with the cultivation of about half a dozen years on the same piece of land, come the disease known as "smut," or "rust," or attacks from the onion-maggot, to such a degree as to make the continuous culti-

vation of the crop on the same piece of land unprofitable ; and this leads the prudent cultivator to transfer it to some other portion of his farm.

Onions are sometimes raised by ploughing up old pasture-land in September, thoroughly harrowing it before frost sets in, and in the spring working in fine manure very thoroughly with the harrow and cultivator. The result of such planting is to get a crop very free from weeds, with onions usually coarse, and more or less of scallions.

Onions can be raised on a variety of soils, but yield the most satisfactory returns on a sandy loam, a gravelly soil, or, to state a general rule, on those soils which are light in structure. As onions are brought on the heavier soils, the first effect will be a deterioration in their appearance ; the outer skin of the yellow varieties losing its fine, clear, translucent yellow, and becoming thicker, duller, and less attractive in appearance. On a large, reclaimed, mucky meadow, located in Chester and Goshen, in Orange County, N.Y., I have seen over five hundred acres growing on one continuous piece of land, with the exception that here and there a few acres of potatoes were scattered among them. Intending to reclaim a meadow of a dozen acres, and bring it into onions, I made a journey of between two and three hundred miles, specially to learn what was possible from so extensive an experience. Two facts covered all there was to be learned : first, they aimed to keep the water at about two and a half feet below the surface ; second, they carted on to each acre of this black, mucky soil one hundred two-horse carloads of a very fine sandy and gravelly loam, made by the decomposition of a slaty rock, and this they spread on the surface, and aimed in all their cultivation to keep as near there as possible. If planted on a wet or very heavy soil, the crop

will mature late, if it matures at all, giving a large proportion of that dread of the onion-grower, scallions, or "scullions," as farmers term them, meaning those whose growth runs mostly to the neck, forming little or no bulb, or bottom. With plenty of manure, onions will thrive well on soil that is very gravelly. I have seen very large crops grown on Marblehead Neck, on land so stony, that, after a rain, on an area of many square yards, not a particle of soil could be seen, nothing but small angular fragments of porphyry, with thrifty onions springing, as it were, out of the very rocks. Let it be understood, however, that this soil was not of a leachy nature, but rested on a hard-pan bottom. The area of land selected should be free of all large stones, as such interfere seriously with the straightness of the rows, the planting, hoeing, and general cultivation of so small-sized a product. Ultimately, good cultivators clear their onion-grounds of large, loose rocks by blasting or sinking them: obviously, the sooner this is done the larger are the returns received from such judicious investments. The land should be laid out in as nearly a square as practicable, as this facilitates estimates of manure, seed, and crops, gives greater regularity to the work, and economizes in the cultivation of a crop which requires a great deal of passing over. To protect the crop from the washing of heavy showers, the land should be level, or very nearly so, otherwise a rush of water will bare the roots of some, and heap the earth around the necks of others, to the injury of each.

PREPARING THE SOIL.

DON'T PLANT a weedy soil to onions, or land which abounds in witch or couch grass, or chickweed; if you do, you will repent it on your hands and knees all

summer long, for such soil will usually require two more weedings than that on which weeds have not been allowed to ripen their seed. To have to keep down witch-grass with your fingers in an onion-bed, is a miserable business, tearing up the onions and your patience at the same time : better delay a year, and meanwhile clear the land thoroughly by a diligent use of the cultivator and hoe, finishing in the fall by throwing the land into ridges, that the freezings and thawings of winter may act destructively on the roots of the witch-grass. Should any scattered shoot of this grass show itself in the spring, let the roots be carefully removed with a fork or spade before the land is ploughed.

It is not always necessary that the land should be turned over ; take a five or six tined fork, drive it slanting into the ground, and give a bit of a pry to loosen the hold of the twitch. Keep rapidly repeating this all over the spot infested with twitch-grass ; then, dropping the fork, you will find that all, or nearly all, the long roots will come up easily by gently pulling with the hand. If any break off, be sure and dig them out.

When onions are planted on land full of the seed of weeds, it is well, if the season is an early one, to give sufficient time for the first crop of weed-seed to start before planting the onions.

In the Eastern States it is found, as a general rule, that success with the first crop of onions is affected by the crop which grew in the land the previous year, and that onions will follow carrots better than any other crop ; next to carrots, corn and potatoes are ranked as good preparers of the ground ; while to succeed well with onions where cabbage or beets were raised the previous year, is comparatively rare. Cabbage, mangolds, and beets draw heavily on the

potash in the land : if, therefore, you will give it an extra feed of this mineral when manuring for onions, by applying either five hundred pounds of muriate of potash, or eighty bushels of unleached wood-ashes, you can follow these as well as any other crop with onions. Were there no other reason, the clean tilth which carrots insure makes it an excellent crop to precede onions. In the fertile lands of the West, the method of procedure is briefly this : Land on which grows the bush-hazel is selected, if accessible, the bushes cut down, and the turf surface but little more than pared in spring with the plough. In this condition it is usually allowed to remain a season exposed to the drying effects of the sun, when it is most thoroughly harrowed and raked, and all the numerous roots and waste are burned, the land ploughed to a moderate depth, and the seed sown either broadcast or in drills. Should the early part of the season prove very wet, the crop sowed broadcast is at times smothered under a rapid growth of weeds ; while with a favoring season, as high as eight hundred bushels to the acre have been harvested.

After the harvesting of the crop which is to precede onions, let the land have a fall-ploughing, and be thrown up into ridges, which will not only help destroy noxious weeds and witch-grass, as above stated, but will leave the land light, in a condition to be worked successfully early in the spring, — a great desideratum for a crop that usually requires the entire season to mature it.

THE MANURE.

ONIONS REQUIRE the very best of manure, in the most tempting condition, and plenty of it at that. Peruvian guano, fish-guano, pig-manure, barn-manure, night-soil, kelp,

muscle-mud, wood-ashes, and muck, are, either alone or in compost, all excellent food for the onion. Old ground, to maintain it in first-rate condition, should receive from eight to ten cords of manure to the acre ; while new onion-ground, to get it in first-rate condition, should receive from ten to twelve cords of manure. When Peruvian guano was held at about sixty dollars per ton, experienced farmers believed that no purchased manure paid as well as this on old beds, provided two applications were made, — one of about five hundred pounds to the acre, to be raked in at the time of planting ; and the other, of like amount, to be applied broadcast when the onions began to bottom. Those who used but one application at the time of sowing, were apt to see surprising effects in a fine growth up to the period of half maturity of the crop, and an equally surprising effect in but little growth from this time through the remainder of the season. Those who have used guano freely on their onion-lands, in the vicinity of Philadelphia, assert that one singular result is, that, after applying it for three years in succession, the seed-onions, for the most part, fail to sprout in such soil, and, when seed is planted, it makes but little growth after vegetating. Pig-manure is held in high esteem by many successful growers of onions in Southern New England. Fish-guano, applied at the rate of a ton to the acre, has given very fine crops.

In the vicinity of large towns, where night-soil can be readily obtained, no more efficient manure can be applied than a compost of this and muck that has been exposed to a winter's frost, or good loam, in the proportion of three parts muck or loam to one part night-soil. If, with this compost, barn-manure and sea-manure are mixed, so much the better ; for it is a rule for this as for other crops, that a

combination of manures in an arithmetical ratio will produce results approaching a geometrical ratio. To make a compost of loam or muck and night-soil, select a spot very near the piece to be planted, and cover the ground with either to the depth of a foot or eighteen inches; then raise a bank of the same material surrounding this floor to the height of three or four feet, with a thickness of from four to six feet. The carts containing night-soil are backed up against this receptacle, and, the door being unscrewed, the contents shoot out. If barn-manure is used, it usually forms part of the sides of the receptacle. During the winter the frosts act on the heap to the further sweetness and disintegrating of it; and towards spring the mass is pitched most thoroughly over, being mixed and made as fine as possible,—sand, when obtainable, having been either previously, or being subsequently, liberally mixed with it, which so “cuts” or separates it that it remains light and fine. After an interval of about a fortnight, allowing time for fermentation, the heap is again pitched over for fining and mixing; and, occasionally, three mixings are made. It would be well for tourists to avoid the onion-districts at this season of the year, as a little experience will amply satisfy them.

These composts should not be made on the ground where the onions are to be planted, for neither onions nor any other crop will grow on such spots the same season.

Muscle-mud, obtained from the seacoast, is rarely used alone, though large crops are sometimes raised on old onion-ground by the application of this alone, at the rate of eight cords to the acre. It appears to give the best results a few miles inland. The strength, and consequent value, of this manure varies considerably: and here let me add that the value of all animal manures will be found to vary greatly;

other things being equal, the higher feeding the animal receives, the better the manure.

Wood-ashes are generally used in connection with other manures at the rate of about two hundred bushels to the acre. Wood-ashes should never be *combined* with other manures, as it will set the ammonia free, and thus deteriorate their quality. Use ashes either by scattering it on the surface at the time of planting, or when the crop is about half grown.

In the vicinity of large towns, of all manures obtained outside the barnyard, night-soil is the cheapest. The first farmer who used it in this locality, comparatively but a few years ago, was universally jeered at by his comrades; but now nearly all the various crops raised in the vicinity of the large towns and cities of the North are fed largely on this manure.

The effect of kelp (by this I mean the sea-manure which is thrown up by the storms on very bold shores), when used as the principal manure, is to give a coarse onion and a late crop, — so late as oftentimes to be in quite a green state at the close of the season, requiring extra labor and care to get it in market condition. In seasons of great drought, however, kelp serves an excellent end, in so retarding the crop that it is not prematurely ripened. In the excessively dry season of 1864, crops along the sea-coast manured with kelp, in many instances yielded double those manured with barnyard and other manures.

The manure is managed most conveniently by dropping it on the land in quite small heaps, at regular intervals, at convenient distance for spreading, which should be done at once. On all land that has not a sharp slope, it is the best plan to apply stable-manure or wood-ashes in the fall. When for onions, apply it after ploughing, and work it into the

surface with a harrow. I close this paragraph on manures by emphasizing the utility of *a thorough fining of it*. I find the Kemp Manure Spreader an excellent means for fining up the manure, and distributing it evenly.

FERTILIZERS.

WITHIN A FEW YEARS onions have been raised on many farms, especially in New England, in part or wholly by the use of fertilizers. These, as a safe rule, should contain about the same quantity and proportion of phosphoric acid, ammonia, and potash as exist in the composition of a large crop of onions. This would require their application in the order just given in the proportion of five, five and nine ; that is, with every five pounds of soluble phosphoric acid we should use five pounds of ammonia, and nine pounds of potash.

The quantity of the mixture to be applied will vary with the condition of the soil, but a safe general rule is to use from a thousand to two thousand pounds to the acre. In applying this, I find it best to scatter about three-fourths of it broadcast as soon as the land is ploughed, and harrow it in, reserving the other quarter to apply just before the crop begins to bottom, when I scatter it over the surface, and mix it by going over the ground with the slide-hoe. Mixed fertilizers especially prepared for onions can be purchased from several reliable firms, such as The Bowker Fertilizer Company of Boston, or Mapes or Baker Fertilizer Company of New York.

Some of my neighbors have raised several crops of onions years in succession on the same piece of ground with success, without using fertilizers specially adapted to the crop. Mr. Ernest Longfellow of Newbury has raised a good crop

for five years by the use annually of from half a ton to a ton of those fertilizers, which go under the name of "phosphates," the analyses of which give about four per cent of ammonia, three of potash, and seven of phosphoric acid. Mr. Procter of Beverly has raised his crop for three years in succession off the same piece of ground by the use of from one to two hundred bushels of unleached wood-ashes, which he applies in the fall. His land has considerable of clay in its composition: that of Mr. Longfellow is somewhat the same in character. Such examples of success in getting good crops without the use of fertilizers whose composition is founded on the analysis of the onion, proves, I believe, that their soil was already well supplied, either in its natural state or by the accumulations from former manuring, (for phosphoric acid and potash in fairly good soils leach out to but a trifling degree) with what the crop needed in addition to what the fertilizers supplied.

In my own practice I have raised my crop of from fifteen to twenty acres annually for the past five years either on fertilizers alone, or by applying half barn-manure and half fertilizers. I consider it a good plan, where manure is used, to apply it on the surface in the fall, running over once or twice with the harrow. From a comparison of the crops grown on the Bermuda Islands, (from whence most of our early onions are brought) between those that are raised on manure and those on fertilizers, where the latter has been the dependence for several years, there appears to be good ground for the belief that the continual use of fertilizers is there apt to produce some of the diseases to which the onion is subject, which will be described farther on. Last season (1887) a large proportion of the crop in Eastern New England was badly injured by the form of blight known as

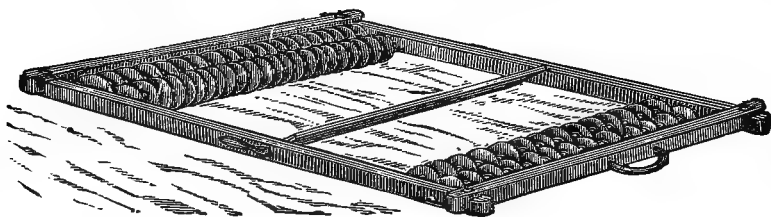
“mildew.” As far as I observed; those crops raised on fertilizers alone appeared to be more injured than those raised on barn-manure. For the future, I shall use part barn-manure and part fertilizers on each of my acres of onions.

PLOUGHING AND PREPARING THE LAND.

THE FARMER who brings up the sub-soil on his onion-bed, will find he has made a mistake. Onions do not require deep ploughing: four or five inches is sufficient depth to insure a good crop. One of the finest pieces I ever saw was managed by carting on the manure in the fall, and simply giving it a thorough working into the soil with an ordinary one-horse cultivator in the spring; after which the land was raked and planted, no plough or any implement other than the cultivator having been used. In this instance the soil was naturally quite light. I have found the wheel-harrow very useful for this end. In the West, the ground having been ploughed in the fall, it frequently receives only a cultivating or harrowing in the spring.

As the great object is to get the land in a thoroughly fine condition, to facilitate the covering of the seed with fine earth, and to leave the land in good working condition for after-culture, no labor should be spared to attain this end. On most soils the ground should be ploughed, cross-ploughed, and thoroughly cultivated. If, from the backwardness of the spring and the consequent wet state of the land, the soil should still be lumpy, it should be thoroughly rolled before raking for planting, and it may be well to brush-harrow it. In raking my own beds, I use the Meeker Harrow (see illustration), which, by going over the ground once each way (the last going-over should be at right angles with the way the seed-rows are to run), leaves the bed in as fine a condition

as though it had been raked by hand, with the advantage of being uniform, which is not apt to be the result when there are several persons raking. I find by actual trial that the Meeker Harrow, with a single man, the driver, on a bed six hundred and forty feet long, can do the work of eighteen men with hand-rakes. Where the land abounds with stones as large or larger than half a hen's egg, this harrow will not press them far enough into the ground to keep them below



the reach of the slide-hoes. As onions grown from the seed usually require in the North the whole season to ripen, the onion-grower breaks ground first of all in his onion-bed, springing to this as early in the season as is possible to work the land into fine condition.

THE SEED.

IN SOME LOCALITIES three pounds of seed were thought sufficient for an acre ; afterward this was increased to three and a half, and then to four ; and now, when raised for tracing, five and six pounds are sometimes planted. As a general rule, four pounds will be found sufficient for an acre ; and, when land is very heavily manured, five pounds may be planted with profit. Land that is planted to onions the first time requires more seed than old land. If it is designed to pull the onions when small for bunching for the

seed that was sown, though sown by farmers who had themselves raised it, failed to vegetate.

Nevertheless, some seasons' seed that is two years old is more reliable than that one year old. This happens when the new seed is unusually light, and the old seed was unusually heavy. My careful test, made in various ways, of the seed grown by me in 1886, and that raised the past season (1887), has demonstrated in every instance, under the same sinking and winnowing, that the old seed is from ten to twenty per cent better than the new. There are two special risks incidental to the sinking-test: first, the danger that the seed will not be thoroughly dried, as onion-seed, when containing sufficient moisture to cause it to sprout if stored in bulk, appears dry to the eye; again, the vitality of onion-seed is very apt to be hurt in the drying of it, particularly so as it is usually deferred until just previous to planting, when matters are greatly hurried (as the risk of injury through this process is considered too great to permit it to be sunk earlier in the season); and then it is likely to be exposed too near the kitchen-stove. The best way to determine whether or not the sunk seed is thoroughly dry, is to keep testing a given measure by weighing it: when it ceases to lose weight, it is dry. The only reliable test for the vitality of any variety of seed is that which includes all the usual conditions of growth. Testing by planting in a hot-house or in a box in a common house is not fully reliable, because the seed are not surrounded by the conditions of natural growth; they then have a temperature very mild and very nearly constant, with no excess of moisture or dryness: whereas the natural condition of vegetation includes the very varying temperature of early spring, usually a great excess of moisture and a low degree of heat, all of which causes,

either single or combined in their effects, draw largely on the vital power of the seed. Hence, seed that under the favoring influences of the hot-house or kitchen may vegetate, may not have sufficient vitality to overcome the excessive cold or moisture of the garden. The result, therefore, of the usual experimental tests can be relied upon as giving only an approximation to the truth.

Among these approximate tests is the simple one of partially filling a tumbler with cotton-wool, pouring in a little water, not sufficient to cover the cotton, then sprinkling a certain number of seed on the cotton, covering it with a little additional cotton to keep the moisture in. Another simple test is to sprinkle the seed to be tested on a moist woollen cloth ; fold the cloth together, and put it in a place moderately warm. The proportion of seed that is good will be known by the proportion that sprout. Experienced eyes can learn something by the appearance and feel of the seed. Old seed require several days longer to vegetate than new.

WHAT KINDS OF ONIONS TO PLANT.

FOREIGN CATALOGUES describe a score and more varieties of onion which are raised in Europe ; but, as far as experiments have been made with them in this country, it has been found that European-grown onion-seed cannot be relied upon to give as good bulbs as American-grown of the same varieties ; while many sorts are not adapted to our climate. A measure of the dubious quality of this foreign seed is well indicated by the lower price at which it is generally catalogued. The past season (1887), I tested on my experimental grounds about all the varieties of onions to be found in foreign seed-catalogues. Out of them all I found but two or three that did not give decidedly more scallions than

onions. Even when they catalogued our American varieties, the crops were miserable ones when compared with home-grown varieties of the same kind raised side by side with them.

Of those grown from seed, the Large Red, Yellow, and White are the three standard varieties in the United States.

The Large Red is commonly known as the Wethersfield onion, it having been extensively cultivated in that locality at an early day in onion culture. This is commonly divided into four varieties ; viz., —

LATE LARGE RED (see illustration) is a very large, thick, late onion, attaining a diameter of from three to six inches, and on the fertile prairies of the West sometimes eight inches.



SECOND EARLY, which differs only in size and time of ripening, being rather flatter than the large sort, not so large, and coming to maturity earlier.

The EARLY FLAT RED is still flatter in form, smaller in size, rather light-colored, and matures earliest of the three sorts, — as early as the last of July.

There is also a fine GLOBE variety of EARLY RED onion (see illustration) in cultivation, which comes to maturity about the same time as the Danvers Early, is of good size and flavor, and in color usually of a very bright, handsome red. The seed of this variety is much sought after by onion-growers, but is difficult to procure in a pure state.



There is a very handsome late variety of onion known as Southport Red Globe, which originated in Southport, Conn. It is quite late, and therefore not safe to plant north of Connecticut.

There are four varieties of the Yellow onion in cultivation, of which the Yellow Flat, called also Yellow Dutch, and Strasburg, and in the Eastern States the "Silverskin," is the parent. These varieties are the Common Flat onion, the Early Cracker onion, the Danvers onion, and the Intermediate onion.

The STRASBURG (incorrectly called Silverskin in the Eastern States, a name which properly belongs to the White Portugal) is not so generally cultivated since the Early Danvers was introduced, as formerly. It grows to a diameter of about three inches, is compact in its structure, and of good flavor. It is a good keeper.

The EARLY CRACKER (see illustration) is flat in shape, of a beautiful honey color, quite compact, and oftentimes hollows a little at the bulb around the neck. It matures about a week or ten days earlier than the Early Danvers, and in fineness of structure and delicacy of flavor is unsurpassed.



This and the Early Flat Red are excellent varieties for raising where the seasons are short. These varieties are becoming very popular in Nova Scotia, and the more northern portions of the United States. They grow to a diameter of from two and a half to four inches.

The EARLY ROUND DANVERS YELLOW onion was originated by Mr. Daniel Buxton and brother of South Danvers, by careful selections of the roundest and earliest specimens from the Strasburg onion. The degree of thickness to which this onion grows, depends not only on a good strain of seed, but also on the quantity of manure used: the higher the manuring, the thicker or rounder the onion grows. The Danvers is an early onion, maturing

within about a week or ten days of the Early Red and Cracker onions. It is very prolific, and, like the Red Globe onion, gives larger crops by about one-third than the flat varieties. When each are seen just before pulling, the difference in the bulk of the crop is not very apparent; but when measured, the globular form of the Danvers "tells." When overgrown by too thin planting of seed, this onion is at times rather coarse in structure; but ordinarily it is very compact, fine of structure, heavy, and a good keeper. When well ripened, I find it keeps equally well under the same circumstances as the Strasburg. The earliness of the Danvers is a great gain in short seasons, or very wet ones; and as this onion begins to form its bulb quite early in its growth ("bottoms down" is the farmer's phrase), it presents marked advantages over the Strasburg for early marketing. In the Boston market the Danvers sells for somewhat more a barrel than the Red. In the South and West the Red varieties are generally preferred.

Having had considerable experience in selecting onions for seed purposes, I find that I can obtain a much greater proportion of handsome, well-developed seed-onions from those that have been raised from seed-stock that has been carefully selected through a long series of years: I am therefore led to believe that there can be "pedigree" onions as well as pedigree cattle, and that seed raised from them can be relied on under the same conditions to give a handsomer onion than can the average of seed.

WHITE PORTUGAL.

THE CULTIVATION of this early onion is mostly confined to the raising and planting of what are known as "Sets" or Button onions, or onions for early family use, as it is a

poor keeper. It is a sweet, mild onion of good size for family use, though averaging considerably smaller than the varieties that have been described. Here let me say, that, for family use, except for frying, the common onions of the market are much too large to be economical : the two outer layers of an onion four inches and upwards in diameter, though making up about half the bulk, are usually coarse and tough, and slough off when boiled. The sweetest, tenderest, and most economical onions for this purpose of the yellow sort are those that are from two to three inches in diameter.

THE QUEEN.

OF THE NEWER SORTS, the "Queen," a white English variety growing from two to two and one-half inches in diameter, is doubtless the earliest at present known, — so early that under favorable circumstances it may grow from seed to a market size about as soon as those raised from Philadelphia sets.



SOUTHPORT WHITE GLOBE.

THIS is a large, globular, white variety, that is about as round, and, when cured in the shade, about as white, as a snow-ball, being the handsomest of all onions. It is a very profitable variety where it can be matured, and is too late to be planted with safety in latitude north of Southern Connecticut.

MARZAJOLE, MAMMOTH TRIPOLI, NASBEY'S MAM-
MOTH AND GIANT ROCCA,

ARE EUROPEAN VARIETIES that grow to a mammoth size in Southern Europe, where for their mild flavor they are held in high esteem. Raised in this country they are of a milder flavor than our common sorts, but, though they grow larger, do not attain to the size they acquire in Europe, and, though excellent for use in a green state, are not good as keepers.

There are usually the distinctions I have here stated between the late and early varieties ; but sometimes drought and other causes will almost destroy these distinctions, ripening the very early and medium early sorts at the same time.

WHAT ONIONS SHALL I RAISE?

HAVING DESCRIBED the standard varieties, a beginner may query in his mind as to what variety would be most profitable and most reliable for him to cultivate.

The Danvers onion is the handsomest shaped, yields as much as any other sort, and more than any of the flat varieties, per acre. It is an onion very popular in the Eastern market, and in Eastern Massachusetts is raised to almost the exclusion of any other variety. The Large Red onion is quite a favorite in the West, and is considered by some dealers to be the best variety for shipping purposes ; though the Danvers is also shipped largely. Those who live in the latitude where the onion is difficult to mature from the seed in one year, affirm that the Red onion will mature farther south than any other variety.

After all, whatever suggestions may be offered, the local

demand will do most for settling this point. Aside from this, I would recommend the Early Yellow and the Red Globe Danvers, as, *on the whole*, the most desirable sort. The Red Globe is somewhat hardier than the Danvers.

ONION SETS OR BUTTON ONIONS.

IT IS GENERALLY BELIEVED that in that portion of the United States south of the vicinity of New-York City, onions from seed raised as far south as the Middle States cannot be relied on to mature the first year, owing to the extreme heat of the climate forcing the formation of the bulb, and drying down the top quite early in the season. *But if the seed was grown in the Northern States from carefully selected stock*, it will mature onions the first season when planted in the Southern States, as I learn from several of my correspondents, some of whom have grown them of market size the first season as far south as Texas. As a rule, such onions are hardly as large as those grown farther north, but yet amply large enough for market. To give the rule, concisely, if gardeners in the South wish to raise onions from the black seed so that they will grow to market size the first season, they should procure *seed grown as far north as possible*; and *vice versa*, gardeners in the North who wish to grow their own sets *should procure Southern-grown seed*. If, in these southern latitudes, two years are given to the maturing of the crop, the first year, the ground is prepared as already directed, excepting that it is but lightly manured; broad, shallow drills, from one to two inches in width, are made about ten inches apart, and these are sown early in spring, very thickly, on rather poor land, at the rate of from thirty to sixty pounds to the acre; the crop becomes mature in July, when it is pulled, and stored in cool, airy lofts,

being spread very thinly over the floor, — those raised from the White Portugal onion to a depth of about two inches, and those from the yellow sorts to a depth of about four inches. A gentle raking occasionally is of advantage to promote dryness, and to prevent sprouting. The yellow variety is the best for keeping, and hence will bear the confinement incident to transportation with less injury; but the clean, white appearance of the onion raised from the white sets gives them the preference in the market. The true set is an onion that has been checked in its annual growth, and dried down before it has matured; hence it has an additional growth to make before its annual growth is matured, and before this there can be no seed-shoot pushed; for the onion is a biennial plant, and the seed-shoot belongs to the second year of its growth.

WHEN PLANTED TO RAISE EARLY ONIONS.

SETS ARE PLANTED in rows about ten inches apart, and two or three inches distant in the row. As the ground-worms are very apt to remove them when first planted, the bed should be occasionally examined. Some roll them immediately after planting: others hold to dropping them in shallow drills, not covering them at all with earth. By the last of June these are ready to sell as green-bunch onions, and come into market as dry onions before those mature that are raised from seed.

Onion-sets vary in size from a pea to a hazel-nut. The smaller the size of the sets, the greater the number of onions contained in a given quantity; but many find it for their interest to purchase sets of a good size, as they yield larger onions. Among the market-gardeners in the vicinity of the large cities, onion-sets are very extensively planted, some

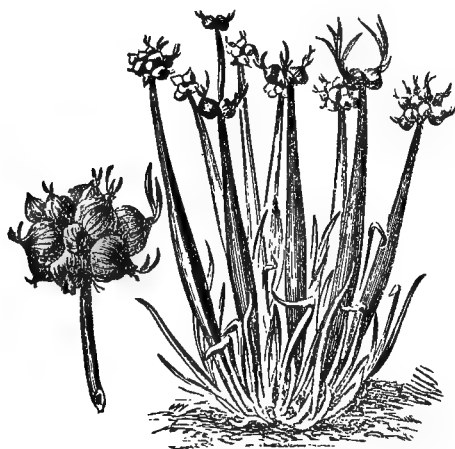
planting as high as one hundred and fifty bushels annually. The quantity planted per acre varies with the size, from six to ten bushels. To get mature onions of good size, the land must be very rich, requiring fifteen or more cords of stable-manure to the acre.

RARERIPES.

RARERIPES ARE ONIONS raised by planting out bulbs of the growth of the previous season. The Rareripe oftentimes differs from the onion-set only in being a matured onion, as frequently they are about as small as the sets. The method of raising them is the same as that of raising early onions from sets, with the difference of planting them at times at greater distance apart in the row proportionate with their greater size. The raising of Rareripes is a very profitable way of disposing of such onions as are badly sprouted, are very small, or in any way unprofitable for marketing. A seed-shoot may be uniformly expected from each onion; but as this greatly deteriorates the quality of the Rareripe, making it tough and woody in structure, it should always be cut off. If cut off before the swelled growth appears (a striking characteristic of the onion-family, and a proof of the skill of the Divine Architect, in strengthening by so simple a process the tall, thin stalk designed to support the heavy seed-head), it will again shoot up; wait, therefore, until this swelling begins to show itself, and then cut below it, and no more trouble from this source will ensue. The smaller the onions planted as Rareripes, the handsomer will be the crop, — the very small ones producing each one handsome round onion, while the large ones produce two or more which are irregular in form.

EGYPTIAN ONION.

EGYPTIAN ONION (see engraving) is the name given to a variety of onion that has some exceptional characteristics. It is decidedly the hardiest of all varieties: remaining in the ground all winter perfectly sound, and starting in the spring, before any other vegetable, it makes a rapid growth,



and is ready for the market about as soon as the onions from seed have received their second sliding. It does not make a round bulb, but one that more nearly resembles the common Rare-ripe; though, as it gets older, the bulb increases in size. The seed

of this variety is the little bulblets that grow on the top of the stalks. These should be planted soon after they are ripe in the fall, as they are rather difficult to keep until spring.

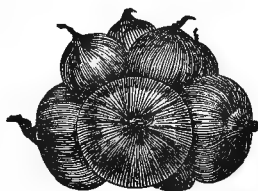
POTATO ONIONS, TOP ONIONS, AND SHALLOTS.

POTATO ONIONS (see engraving), Top onions, and Shalots, are thought by some to have originated from the common onion. It is certain that at times all three of

these varieties are sported by the common onion. In a large field of seed-onions, occasionally small onions will be found, growing in place of seed ; and these onions, when set out the ensuing spring, will vegetate and develop readily, but they will not always in turn yield the like ; i.e., Top onions.

Potato onions, or multiplying onions as they are sometimes called, are a thick, hard-fleshed variety, very mild and pleasant to the taste, and tender if eaten soon after gathering, but they grow to be tough as the season advances. They are poor keepers, unless spread very thinly in some dry apartment. They are propagated

by planting the bulbs in drills, fourteen inches apart, the largest ones six, the smaller four, inches apart in the row, and the smallest ones two inches. The small ones rapidly increase, and make onions from



two to three inches in diameter ; while the larger ones divide, and make from four to a dozen or even sixteen (usually from five to eight) small, irregularly shaped onions. It will be seen that the larger bulbs answer the same purpose as the seed in the common onion ; hence to have onions for sale, and yet maintain the stock, it is necessary that both sizes should be planted.

The Potato onion should be indulged for its best development in a soil rather moister than the varieties from seed. The advantage of the Potato onion is its earliness, and the fact that it is not as liable to injury from the onion-maggot, when that abounds, as the common sort. I have seen an instance where, on half an acre of each growing side by side, the common onion (that raised from seed) was almost wholly destroyed, while the Potato onion was nearly uninjured.

Shallots differ from Potato onions principally in their characteristics of *always* multiplying : a Shallot *never grows into a large round* onion, but always multiplies itself, forming bulbs that average more oblong and are usually smaller than those of the Potato onion. I find them occasionally pushing a seed-shoot, which I have never seen in the Potato onion. Their habit of growth is finer, making a longer and more slender leaf than the Potato onion. They are mild of flavor, and greatly excel every other variety of the onion-family in their keeping properties : with little care they may be kept the year round. All seedsmen do not know the difference between the Potato onion and the Shallot. Within a few years, I have twice had Shallots sent me under the name "Potato onion."

Top onions are propagated from little bulbs, which grow in this variety where the seeds grow in the common sorts. They grow to a large size, are pleasant, mild-flavored, rather coarsely and loosely made up, and have the reputation of being poor keepers. Raised like the Potato onion.

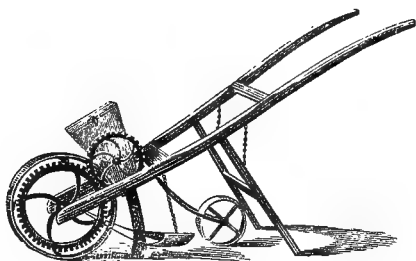
SEED-SOWING MACHINES.

THERE ARE A VARIETY of machines in the market for sowing onion and other seed, but most or all of them can be arranged in three classes ; viz., Brush Sowers, Snap Sowers, and Agitators.

Brush-machines are those in which the seed is forced out by a brush contained in the seed-box. The characteristic feature in this class of seed-planters is of English origin. It has passed through various modifications in this country.

The Brush-machine (an engraving of which is here presented) makes the drills, drops the seed, covers and rolls it : it is adapted for planting all the common root-crops.

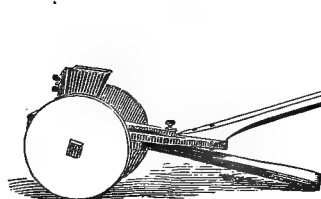
The rows in this machine are marked out by a chain, two of which hang near the handles and drag on the ground, being used alternately. The wheel is pushed along the mark made by the chain.



The principle on which the "Snap" machine is founded, is the securing the flow of seed through the aperture by a jerking motion, which is usually effected by a spring which makes a snapping noise when set free.

One of the machines built on this principle is known as the Danvers Onion Sower. (See engraving.)

The structure is exceedingly simple; and as it involves



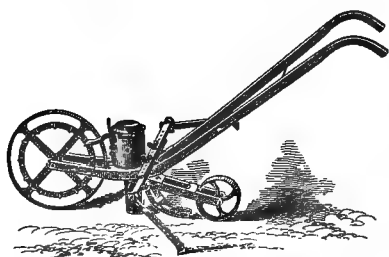
but few parts, and hence is but little liable to get out of order, and when out of order can readily be repaired by any blacksmith

it was quite a favorite with onion-raisers: but improved implements have to a large degree taken the place of it.

The Danvers machine opens the furrows, drops the seed, covers it, but does not roll it. Farmers usually attach an old horseshoe to the end of the seed-coverer, which gives sufficient weight to make it answer pretty well the purposes of a roller.

Matthews's Garden Seed Drill is a fine example of the seed-

planters on the "agitator" principle. This agitator is a finger of iron in the seed-box which projects just over the orifice from which the seed drops, and, by a motion given it by the revolving of the wheel, keeps the seed continually stirred, and thus prevents its



clogging, — a trouble to every gardener when planting such seed as beet and parsnip. Were I called upon to recommend a seed-sower for general work, it would be the Matthews: all in the market have more or less of good qualities, but I have found that the Matthews combines as many as any other one.

In these machines, the seed falls through holes of various sizes, made either in little slides of tin, or in a movable circular plate of iron; different slides being substituted as the seed to be sown is larger or smaller, or the quantity to be planted is greater or less. Farmers will often find it for their interest to enlarge or diminish the size of these holes. The holes in the tin of the Danvers Sower, to give a liberal sowing of about four and a half pounds to the acre, should be large enough to drop ten to fourteen onion-seed to each snap. By putting the hand under, and counting the seed which falls in a dozen snappings of the machine, a reliable average can be ascertained. As the size of onion-seed often varies, no particular size of hole can be relied upon: it must be tested for each season. Another convenient test is to trundle the machine over the barn-floor, or a newspaper spread and secured in the field, and observe how thickly

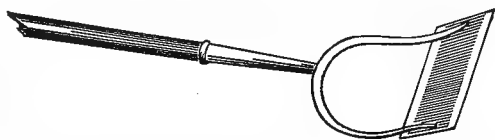
the seed fall. For a beginner, the first test is the better one.

Of the sower which drops the seed in hills, I will treat presently under the head of "Onions with Carrots."

PLANTING THE SEED AND HOEING THE ONIONS.

HAVING SELECTED our seed-sower and regulated it, the next step is to plant the seed. It is exceedingly necessary that the first row planted should be straight, as this becomes a measure of straightness for all the others. A steady hand and a good eye are of great value here; but with but a little practice, a degree of accuracy can be obtained by most persons, though a few will always find it for their profit to hire some experienced hand. Three or more stakes may serve to mark out the first row, and, by keeping these bearing on each other as the machine is pushed along, the first line must be a straight line. In some machines the chains which drag from the handle, and in others the wheels, serve to mark

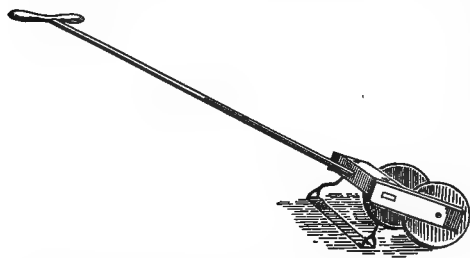
out the rows. As the Scuffle Hoes (see engraving) and



Wheel Hoes (see engraving) to be used will be of a constant width, it is important that the distance between the rows should be kept constant, particularly that they should not be brought nearer together than the distance fixed upon. The distance between the rows varies in different sections from twelve to fourteen inches: when seed are planted for sets, ten inches is the usual distance between the drills.

The various hoes used in weeding are pushed before the operator, and again drawn quickly back, the operator taking

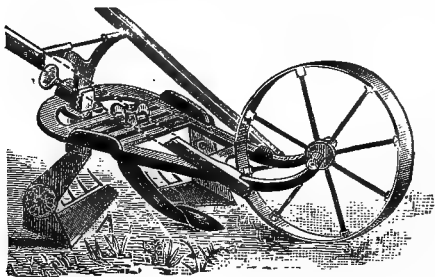
short steps, and making the hoe cut in both the forward and backward slides. The great aim of the hoeing being to save



all hand-weeding possible, the hoe should be slid as near as possible to the side of one of the rows, and then, having been drawn

back, should next be slid as near as practicable to the other row.

All the various weeding-hoes can be divided into those whose blades are parallel with the ground, and those whose blades are vertical to it. In a test I made a couple of years ago with twelve different hoes, I found that those whose



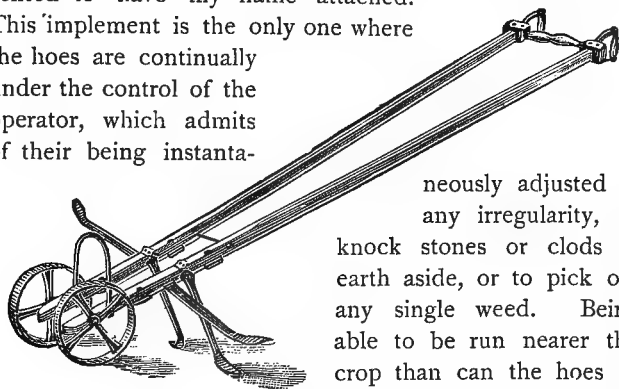
blades worked horizontally were decidedly the better when the onions were young, they being less liable to throw dirt over the plants. The Ruhlman Hoe (see engraving) is a good

variety of the Wheel Hoe, to be used with profit when the weeds are large, or the ground is hard.

Within comparatively a few years, there has been invented a new class of weed-hoes called "Straddlers," from the fact that they straddle the rows, and so weed both sides at the

same time. In some of these, the hoes are adjustable by screws, so that they can be arranged to go as near the row as may be desired. The Southport Hoe, and one of the Planet series, are illustrations of these. In my judgment, decidedly the best of this class (and some of my fellow-farmers who have used it think likewise), is the "Finger Weeder" (see engraving), to which I have consented to have my name attached.

This implement is the only one where the hoes are continually under the control of the operator, which admits of their being instantane-



ously adjusted to any irregularity, to knock stones or clods of earth aside, or to pick out any single weed. Being able to be run nearer the crop than can the hoes of any other implement, they

leave fewer weeds to be pulled by hand, and thus save expense in what is the most costly department of onion-raising.

After the tops get so far grown as to bend over into the rows, they are apt to be caught between the wheel and axle of the wheel-hoe; hence from thence forward, either the single wheel or the scuffle hoe should be used.

Farmers sometimes make their own scuffle-hoes out of a piece of an old saw, the teeth answering a good purpose in cutting off the weeds.

In Eastern Massachusetts fourteen inches is the usual

distance between the rows ; while in Southern New England and parts of the West, twelve inches is preferred.

Before planting the seed, it should be carefully examined to see that it is free from small stones, or any substance that can possibly clog the hole of exit. Stones or fragments of seed-heads, when so small as readily to pass through the holes, will do no harm. Let it be remembered, when regulating the machine, that the seed will not be likely to fall so fast from a full hopper as they will when it is nearly empty. The seed should be sown from half an inch to an inch under the surface, from twelve to fifteen to the foot when four pounds are planted to the acre. Deep sowing has the advantage of getting the plants so deeply rooted that they will bear having the earth slightly pulled away from them in the first weeding, without so much injury as sometimes results when they are planted shallow. While planting, as well as when using the hoe, our farmers will find the advantage of having a finely pulverized surface to work on, free of all clods, sticks, and stones ; as such will continually vary the straightness of the rows, interfere with the planting and covering of the seed, and, when the hoe is used, glance it out of its course in among the tender plants.

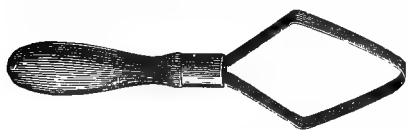
WEEDING.

IN FROM TWO TO THREE WEEKS, if the weather is an average for the season, the young plants by a close examination may be seen pushing their green arches above the surface, bearing a close resemblance to a curve of grass. As soon as sufficiently up to enable a sharp eye to determine the course of the rows, without delaying a day or an hour, if the weather permits, the prudent cultivator will slide through his scuffle-hoe ; as at this season of the year the weather is

very uncertain, and the land may become too wet to be worked soon after the young plants appear, and yet not too wet to hinder a rapid growth of weeds. Sowing a few radish with the onion seed is sometimes practised. As the radish-seed vegetates in a few days, the rows are thereby marked out, and the wheel-hoe can be used earlier. Care need be taken that the radish-seed are not larger than the onion, and so clog the hole. To obtain very choice cabbage-plants, which grow fine and stocky, farmers sometimes drop a few seeds into the hopper with the onion-seed. On so rich a seed-bed, prompt action is very necessary, or a miserably discouraging tangle will soon be the result of negligence. In their comparative freedom from weeds the cultivators in the West, on their new land, have a great advantage over their brethren in the East. By selecting pasture-land, and avoiding the use of barn-manure, the work of weeding may be greatly reduced. I have raised a crop on such land, when the entire expense from after the crop was planted until it was gathered and got into the barn was but thirty-five dollars to the acre. It was so free of weeds that one man slid through, hand-weeded, and partly thinned, an acre and a quarter inside of a day. Within a day or two after the hoe has passed through the rows, the young plants will need their first weeding with the fingers. Though when the young onions first appear above the surface, scarcely a weed can be seen, a dear-bought experience has proved to me that a disturbing of the surface at that time close to the plants (it may be done by the fingers, or by some form of weeding implement) destroys the first crop of weeds just as the seed has sprouted, at which stage they are most easily destroyed. This is hand and knee work; and pursued, as it has to be, in this position at intervals throughout

the heat of summer, it is to many the most wearying work of the farm. Boys being more nimble-fingered than men, besides working for lower wages, there is a great saving in employing them, *provided* they can be relied on to pull up the roots of the weeds. When several are at work, it will be wise to have a man with them.

To protect the knees from sharp stones, "pads" are used, which consist of squares of about eight inches, of several thicknesses of woollen, usually covered with leather, strapped to the knees. In ordinary seasons, onions require three or four hand-and-knee weedings, and from four to six slidings with the hoe. A man's judgment must be his guide. As onions shade the ground but slightly, weeds grow rapidly in onion-beds; and, if they are once allowed to get the start, the labor of cultivation is immensely increased. Some cultivators practise scratching the soil away from the onions when weeding, with an old knife curved at a right angle near the point, or by a piece of iron hoop curved, the end being nailed to a small piece of wood conveniently held in the hand. Noyes's (see engraving) or Lang's hand-weeder



will be found a very handy little implement for removing weeds, particularly when the surface of

the ground is somewhat hard. The strap in Lang's (see engraving) enables the person weeding to retain it while not in use, and yet have full command of his fingers. When the onions have begun to "bottom



down," i.e., form their bulbs, it is the general practice to remove as far as practicable any surplus earth that has accumulated around them. In weeding, two or three rows are sometimes taken together. Just before the crop ripens down, larger weeds will show themselves here and there over the beds: these are generally gathered in baskets, and dropped at the end of the rows. If the seeds of such weeds get ripe before they are pulled, the weeds should be carefully deposited in a pile in some by-place, where they can be burned when dry. Growers who practise throwing such weeds to their hogs because they are large and succulent, make an annual seeding of their beds with weeds. Particularly is this true of purslane, one of the greatest plagues in the heat of the season. This pest propagates itself by cuttings as well as from seed, every little portion of the plant readily rooting, as I have proved by experiment; hence, all portions of the plant should be removed from the bed. The habit of this plant is to ripen the seed well down on the stock, while the main body of the plant is in its full vigor; hence it usually happens that much seed drops into the land some time before it is pulled, while the farmer never mistrusts it has ripened. I have seen purslane completely eradicated from garden-plots where it formerly was a pest, by a little care in this matter of letting it go to seed. The same remarks apply to the weed known as chickweed, which on rich and moist soil will spread appallingly fast, if not destroyed when so young as barely to be detected. It is apt to get the start of gardeners, because at the same time ripe seed and buds and blossoms are to be found on it. I consider it the most troublesome of all weeds. When blank spots occur from poor seed, poor planting, or the ravages of the onion-maggot, bush-beans, cabbages, or tomatoes may be planted.

When the plants are too thick, they should be thinned ; but the beginner had better pull with a sparing hand, for, if the ground has been manured very liberally, the crop will do well when the plants are very thickly together ; and they will oftentimes grow as large, and usually bottom better, when very thick, as they will with three times the room. Onion-growers like to see their onions piled two or three deep as they grow, the upper layer being entirely out of the ground with the exception of the roots. When the tops begin to fall over, the onion is rapidly maturing, and the bulbs will now grow very fast. Farmers will tell you that "the top is going down into the bottom." The Strasburg onion begins to bottom late in the season, while the Danvers makes a very encouraging show of bulb quite early. Should the land have been but poorly manured, in seasons of drought, the crop will be apt to be ripened prematurely, forming a small-sized onion ; while (divided, it may be, by merely a wall) those that have been more liberally manured stand the drought, and keep green sufficiently long to receive advantage from the later rains, — an investment of twenty dollars in manure thus making a difference sometimes of a hundred dollars in the crop. If the crop is quite backward, late in the season the necks of the onions are sometimes bent over to hasten the formation of the bulb. This is done by hand, or by rolling a barrel over two rows at a time.

STORING THE CROP.

WHEN THE NECKS have fallen over, and the great proportion of them are dry, the crop should be pulled by hand, and be laid in windrows, about three rows being put in one. At this time all weeds remaining should be pulled and piled, preparatory to the final clearing of the bed. The

pulling of the crop should not be delayed after the tops are well dry ; for, if rain should now fall, the onions will be apt to re-root, to their injury. On soil comparatively free from stones, a wheel-hoe, with the blade of a circular form, is used to run under the onions, and loosen them from the ground. A stout iron scraper to be attached to the end of the cultivator, from two to three feet in length, makes a very handy implement to use after the onions are pulled, to cut up the weeds between the rows ; after which they, with the small stones, can be raked into heaps, to be carted off. Should the backwardness of the season make it necessary to pull the crop in rather a green state, it will be well to allow it to remain untouched, after pulling, for about a week, before turning or stirring, which will tend to hasten the decay of the greener tops ; otherwise they should be carefully stirred every pleasant day with a wooden-toothed rake. This should be very carefully done, as the onions are very easily injured, especially at this stage, and when injured are almost as likely to rot as a bruised apple. See that they are not injured in the raking or by the treading by a careless hand. The white varieties need peculiar handling, as they, being more delicate, are more apt to decay ; and, besides, a direct exposure to the sun's rays will cause them to turn green. These should be pulled as soon as the tops begin to fall, be piled in small heaps of not over half a dozen bushels, and be covered with two or three bundles of straw to protect from sun and rain. When the weather is well below freezing, they should be housed in a dark place, and be piled not over six inches deep. When the crop is thoroughly dried, the onions feeling hard to the handling, it will be ready for topping for market. If over-dried, the outer layer of skin will peel off, to the injury of the crop. Let them be carefully collected

in baskets, rejecting all stones, scallions, and rotten onions, and taken in wagon-loads to the barn, when the tops are to be cut off clean to the onion with a sharp knife, or what is decidedly better, as it is less likely to tear the onion, a pair of small shears or scissors; or, if the necks are small and quite dry, they may be pulled off by the thumb and finger. This is usually done by boys or females at from two to four cents a bushel. While collecting, look sharply on the bottom of the onions to detect rotten ones. Some growers prefer to leave such of the crop as they design to keep for a late market untopped. If it is intended to market the crop immediately, the onions may be piled to a depth of three or four feet; otherwise they should not be over two feet in depth. The floor should not be a tight one: if it is, then a false open one should be made above it, with an air-space of six inches underneath. Leave the barn doors and windows all open every pleasant day. As the crop is topped, those of the size of a hazel-nut and smaller are classed as pickle-onions; these being marketed principally for that purpose, usually bringing about half the price of the full grown ones.

TRACING, OR ROPING, ONIONS.

WHEN THE CROP has ripened down but poorly, the greener onions are at times traced. This is done by cutting off the neck within about two inches of the bulb; and binding it to a handful of straw; beginning at the butt end of the straw, lay the neck against it, give two or three firm turns with the twine (net or wrapping twine), add another onion, and thus proceed till the straw is covered, the larger onions being tied to the bottom and gradually decreasing in size to the top. Onions so slowly ripened that they

would soon spoil if stored in a mass, will keep well when traced, and oftentimes bring a greater profit than the best of the crop. Rareripes, and such of the earlier onions as are to be sent long distances, or be kept a while before marketing, are sometimes traced. Traced onions keep in good condition a long while in a dry, cool place. Within a few years tracing has almost ceased in this vicinity.

MARKETING THE CROP.

THE SET ONIONS, Potato onions, Top onions, and Rareripes, in some sections, are for the most part sent to market in a green state in bunches. The Potato onions are also brought from the South, dry, in large quantities, to supply the Northern markets, soon after the arrival of the Bermuda onions, just before the ripening of the Northern crop. After the Potato onions follows the earliest variety of the Red, and, immediately after, the Danvers, and, finally, the Large Red completes the season. The sales in the Northern markets early in the season are made mostly for the supply of the local immediate demand, the great bulk of the crop not being sent in before the call for shipping purposes has commenced. For this reason, farmers find it to be for their interest to do but little more than feel the market until about the middle of October; as large purchases made previous to this period are mostly as an investment by speculators, with the exception of such lots as go to supply the immediate wants of the markets of large towns and cities of the extreme North beyond the limits of the onion-growing region.

The price of onions varies greatly: they have sold as low as seventy-five cents a barrel, while the early crop of 1864 sold as high as sixteen dollars a barrel, by the five hundred barrels. From September to March, in the same season, the

fluctuation is sometimes between two dollars and nine dollars. At this date (April, 1888) good Danvers onions are bringing in Boston from seven dollars to nine dollars per barrel. Crops have at times been sold to be delivered in the course of two months, and in that time have more than doubled in price. The general truth is, that those brought latest to market, being kept till spring, bring the best prices. The great facilities afforded for onion-raising by the fertile soil and favoring climate of the West, combined with low freight-rates, have within a few years told powerfully on the Eastern market.

PRESERVING THE CROP.

IF IT is the design to keep the crop for a winter market, it should be stored in a cool, dry place, out of danger from severe frosts, — if in bulk, then not over two feet in depth; or they may be put up in barrels, which should be nicked in three or four places on their sides, and one or two places at each end, if headed up, and be laid on their bilge. Another good plan is to store them on a lattice-work of slats at not over a foot in depth. If it is the design to keep the onions till spring, in my experience (and the plan is largely practised in Connecticut) the simplest way is to freeze them. To do this, select some out-building, under which the air has the least circulation, spread the onions about fifteen inches in depth, leaving a vacant space of about two feet from the sides of the building, which fill in with fine hay. As soon as the onions begin to freeze, cover them with any kind of dry hay, to the depth of about eighteen inches. Let them remain subject to as little change of air as possible (the aim being to keep them from freezing and thawing) until spring. When the frost is entirely out, they should at once

be spread abroad, well aired, and turned carefully and often until thoroughly dried. If they are handled while frozen, they will be very likely to decay as they thaw out.

SMUT, RUST, AND MAGGOT,

THE ONION-CROP is sometimes severely injured by a disease resembling mildew, which is believed to be caused by animal parasites. The tops of the leaves die, and the whole plant is more or less covered by a white blast. From the effects of it the onions almost cease their growth, and the crop finally obtained is small in size. It is more frequent in extraordinary wet seasons, or during a long spell of "dog-days," and is more common on old beds than new. The best remedy yet known for old beds is to carefully remove from the bed and destroy at the close of the season all diseased bulbs, as they will be likely to spread the disease by giving it a lodgement in the soil; then run the plough a little deeper, and thus mix in a little new soil. A liberal application of air-slacked lime to the leaves as soon as the white blast appears, is said to kill the parasites that cause it. "Smut," as a black discoloration of the leaves is called, is a deadly enemy. Whenever this appears, the bed must be changed to a new location, and the land be cultivated to other crops for four or more years before it can safely be replanted to onions.

The onion-maggot is hatched from the eggs of a fly, which are deposited in the plant (not the seed) very near the surface of the ground. Its presence may be detected in the crop when very young by the sudden turning yellow and falling over of the plant, which, if the attempt is made to pull it, will usually break off near the surface; and, on squeezing, several small maggots will present themselves.

Some writers state that the fly deposits its eggs only at an early period in the growth of the plant. It is true that usually the injury is most marked previous to the bottoming of the onion ; but I have seen beds injured at every stage of their growth, and in one season about half of the crop was destroyed by the maggot at the close of the season after the onions had been pulled. Sometimes an extra pound or more of seed is planted with the idea of allowing the maggot a share, with the hope that by so doing an average crop may be raised. But, as the habit of the fly is to deposit its eggs continuously in every plant until the supply is exhausted, the result is an alternation of blank and extra thick spaces. Various remedies have been proposed, but of these it may be said that they are not practical on a large scale. The idea on which most of these are based, is that of producing a scent so disagreeable as to drive away the fly ; but old experimenters recall the capacity of the canker-worm moth and the squash-beetle to ignore the most repulsive obstructions of this kind, when stimulated by their instinct to deposit their eggs. Pine sawdust, either clear, soaked in the urine of cattle, or in the ammoniacal liquor from gas-works, scattered over the bed just before the appearance of the plants, at the rate of a bushel to ten square rods ; guano sprinkled along the rows and on the plants, twice during the season ; unleached ashes used in the same manner, — these have given satisfactory results to some growers. Scalding water poured from a common watering-pot through a hole the size of a pipe-stem, along the drills near the roots of the plants, and repeated three or four times during a season, is said to be efficacious. It is obvious that the practical value of such a remedy must be confined to a very small area of land.

The best remedy for the maggot, in my experience, is a hen and chickens. Allowing a couple of broods to an acre, confine the hen in a small coop near the middle of the piece, and give the chickens free exit. They will soon learn to catch the fly while in the act of laying the egg which produces the maggot.

In New England the maggot has been slowly making his way from the North, adding greatly to the uncertainty of the crop, until his ravages have extended to Southern Massachusetts. Very light soils appear to be most affected by his ravages. In some seasons the injury done is insignificant.

He will one year confine his ravages mostly to one portion of a township, and the next season reverse matters: while some tracts are almost never injured, on others he appears to settle down as a permanent resident.

RAISING ONION-SEED.

WHAT DOES all this investment of money, time, labor, and watchfulness amount to if the seed is worthless, has no vitality, is not true to name, or was grown from worthless trash? Onion-seed should be raised from the very best onions of the very best crop grown in the vicinity. The best type should be first selected, which should be a medium-sized onion of the right form, very hard and compact in structure, with a close, thin, fine skin, and a very small neck. Those selected for seed should be the earliest ripened of the crop, provided such are fully ripened and not blighted. To select the earliest onions, the seed-grower should visit the field before the crop is pulled.

Onion-seed is usually grown from the entire crop, be it good, bad, or indifferent. A great step of improvement on this is to purchase outright as good a crop as can be found ;

but the only way to secure and keep the best and most reliable seed, is that first given. Poor onion-seed is always very dear, indeed, as a present ; while first-class seed, at the highest price yet paid, is worth a long and careful seeking. I was once shown a sample of the onions planted out to raise one of the largest crops grown in California. They were nothing more than small onions, known in the trade as "picklers," and of a miserable, poor quality at that. I would not be understood as stating that all the seed raised in California is grown from such trash : I know the facts of this crop only. A very large proportion of the Danvers-onion seed now sold in the United States is raised in California, though it is often sold as Eastern-grown. Onions raised from California-grown seed are not considered to be as good keepers as those raised from seed raised in the East.

Seed-onions should be kept in a cool, dry place, spread to about a foot in depth ; if kept in barrel (old lime-casks are best), these should be left unheaded, and two or three pieces should be chopped off near the bottom to admit a circulation of air. When kept by freezing, then with care they may be planted out, even before the frost is out of them. As early in the spring as the ground can be worked, they should be set out in trenches (the onion, when covered in trenches, will stand a heavy frost without injury), which should be from three to four feet apart, and about four inches below the surface, the land having first been heavily manured. Some good seed-growers apply their manure directly in the trench ; while others spread it broadcast, and plough in. I prefer to plough in a liberal quantity, and then use ashes, superphosphate of lime or guano, in the rows, being careful to mix it very thoroughly with the soil. If the

onions are much sprouted, the sprout may be cut off quite home to the onion, which will insure a straighter and healthier growth. Care should be taken to plant right end up; for, odd as it sounds, in the spring it sometimes requires a little care to determine which is the right end. After the seed-shoot is well pushed out, earth should be drawn up to it; and this should be done three times during the season, until it is heaped around them six or eight inches above the surface of the ground. The first hoeing should be given them very soon after the sprout starts, to *fully cover the onion*, as when exposed it is very apt to decay. With this support, on land that is not too moist, I find that no further precaution is necessary to keep the seed-tops from the ground; though it is the practice of some growers to support the stalks with light strips of wood, or a line drawn along about two feet from the ground. After the last hoeing (and very clean culture should be given then), they should be gone among as little as possible.

The seed-tops may be safely cut (leaving two or three inches of the stem on) when the seed-vessels begin to crack, or, what is a better guide yet (for, after the seed-vessels begin to crack, much seed is apt to be lost, especially by heavy storms), after the turning yellow, near the ground, of the seed-stalk: when this occurs, the top may be removed immediately, even though it should appear quite green above.

Seed-tops will be often found in which the seed in the shortest-stemmed receptacles is ripened, and the receptacles themselves are cracked, while a fresh growth of seed-vessels in a green state almost conceal them: in such cases I would advise the cutting of the top. The tops when cut should be spread to a depth of three inches or less, in a warm place where heat and air abound, and be turned two or three times

daily, until thoroughly dried, when the seed is ready to be threshed out. It may be stored in barrels in a dry loft, and threshed as wanted. If the seed is plump, and has been well ripened, the frequent turning of the stalks will have shaken out by far the larger proportion of it, — in some seasons more than five-sixths. To clear the seed, winnow it. If the seed are light, it will be best to sink it in water, pouring off all that floats. After it has been very thoroughly dried, it will need to be winnowed, and probably more or less hand-picked, to remove hulls and stones.

As the seed-stalks make but little shade, the ground between the rows can be cultivated to spinach, lettuce, radishes, turnips, or some early vegetables, but this will make the hilling of the seed more costly; and, when these are harvested, the ground may be planted to cucumbers for pickles. The planting between the rows should be confined to the middle, and in trenches an inch or so below the surface, unless it be made after the onions have received their final hoeing; otherwise the drawing of the earth around the seed-stalks will seriously interfere with these crops.

Strange as it may seem to those who have not tried it, such rampant growers as squashes can be raised among seed-onions, and generally with no material injury to the seed. I have known five tons of Hubbard squashes grown on about half an acre of ground planted to seed-onions. The squashes should be planted towards the close of May, after the onions have received their final hilling, two or three seeds being planted close to every other row, and about nine feet apart in the row: allow but *one plant to grow in a hill*. The vines, thus having plenty of room between the rows to spread about, do not incline much to climbing on the seed-stock. Care should be exercised to break off at once the

tendrils of such as attempt to climb. The one-plant-to-a-hill system will be found to yield as liberal a crop and finer squashes than the old system of three or four to the hill.

The yield of onion-seed to the barrel of seed-onions varies greatly: indeed, no investments near the seaboard prove more speculative. The maggot sometimes proves very destructive, so much so that the crop will not average half a pound to the barrel; or the stalks may turn yellow at the bottom, and the crop blight, and prove a failure within a week of the time for it to ripen.

When the seed is fully dry (and seed that has been sunk should have a long exposure to the air, and frequent stirrings: I have known large lots spoilt from want of care in this), it should be so stored as to be safe from all injury from cats and other animals, who are apt to resort to it, to the utter destruction of its vitality.

RAISING CARROTS WITH ONIONS.

THE PLAN of raising carrots with onions is considered a great improvement by many who have adopted it, as the yield of carrots is thought to be a clear gain, diminishing but little or none the yield of onions. Carrots are planted in two ways, — one by sowing them in drills between every other row of onions; and the other, which is considered an improvement, called the Long-Island plan, by planting the onions in hills from seven to eight inches from centre to centre, dropping a number of seed in each hill, and from the first to the twelfth of June planting the carrot-seed, usually by hand, between these hills in two rows, then skipping one, and thus on through the piece. The onions as they are pulled are thrown into every third row, the carrots being left to mature. By this method, from two hundred to six hun-

dred bushels of carrots are raised per acre in addition to the usual crop of onions. More manure is required for the two crops than for the onions alone.

The machine used for sowing in drills where carrots are raised with the crop, has two boxes attached to the axle at equidistance from the wheels: there are three or four holes in the axle that communicate with the seed in the boxes, and as these holes pass under the boxes they are filled with seed, and, as they turn, the seed are dropped into the earth. Screws are sunk into the holes, which can be sunk more or less at pleasure, and the quantity of seed which the holes will contain is thus graded.

The machine should first be tested and so regulated that on a barn-floor it will drop from eleven to twelve seed from each hole. When so regulated, on using in the field it will drop but from seven to twelve, owing to the more uneven motion.

This, like all sowing-machines, — and the same may be said of the scuffle-hoe and wheel-hoe, — is pushed along before the operator.

ANALYSIS OF THE ONION.

AN ANALYSIS, under the direction of Professor Goessman of the Massachusetts Agricultural College, gives the following as the principal constituents of the onion: —

Air-dry onions without leaves were found to consist of —

| | | | |
|----------------------------|---|---|----------------|
| Water (at 100° to 110° C.) | . | . | 89.20 per cent |
| • Dry vegetable matter | . | . | 10.80 “ |

and contained the following amounts of —

| | | | | | | |
|----------|---|---|---|---|---|---------------|
| Nitrogen | . | . | . | . | . | .212 per cent |
| Sulphur | . | . | . | . | . | .048 “ |
| Ash | . | . | . | . | . | .436 “ |

The percentages of the principal constituents of the ash were —

| | |
|--------------------------------|----------------|
| Potassium oxide | 38.51 per cent |
| Sodium oxide | 1.90 “ |
| Calcium oxide | 8.20 “ |
| Magnesium oxide | 3.65 “ |
| Sesquioxide of iron | 0.58 “ |
| Silicic acid | 3.33 “ |
| Phosphoric acid | 15.80 “ |
| Sulphuric acid not determined. | |

In the above table, potassium oxide, sodium oxide, calcium oxide, and magnesium oxide, mean practically pure potash, soda, lime, and magnesia.

I infer from the table, that of the three grand essentials in manure,—nitrogen, potash, and phosphoric acid,—the onion requires about equal quantities of the two former, and half as much of the latter.

PRICES OF IMPLEMENTS.

I CAN SUPPLY most of the implements named in this book at the following prices:—

| | |
|--|---------|
| The Meeker Harrow | \$25.00 |
| Matthews's Garden Seed Drill, latest im- | |
| provements | 10.00 |
| Danvers Onion Sower | 8.00 |
| Danvers Onion Sower with latest im- | |
| provements, extra made | 12.50 |
| Wheel Hoe | 1.50 |
| Scuffle Hoe | .65 |
| Ruhlman's Hoe | 5.00 |

| | |
|-------------------------------------|--------|
| Gregory's Finger Weeder . . . | \$7.00 |
| Noyes's Weeder . . . per mail, .30, | .25 |
| Lang's Weeder . . . " " .30, | .25 |

My farmer-friends, I have now given you the result of my own experience in the raising of onions, Potato onions, Top onions, Shallots, and onion Sets, combined with the experience in onion-growing of a neighborhood where a hundred thousand bushels are raised annually, with the results of personal observation in other localities, and with facts that I have collected by corresponding with different sections of the United States.

I hope this contribution will prove acceptable.

JAMES J. H. GREGORY.

MARBLEHEAD, MASS.

ADDENDA.

I KNOW my readers will enjoy the perusal of the following able report on the onion maggot by Prof. C. H. Fernald of the Massachusetts Agricultural College. His suggestion of rolling the ground just after planting is strongly indorsed by one of my neighbors who has tried the plan : —

THE ONION MAGGOT.

HIS HISTORY: HOW HE OPERATES AND HOW TO FIGHT HIM.

“The onion maggot (*Phorbia ceparum*, Meig.) has caused a great amount of injury to the onion crops, both in this country and in Europe. Its life history is briefly as follows : —

The eggs, which are laid on the leaves near the ground, are white, smooth, somewhat oval in outline, and about one-twenty-fifth of an inch long. Usually not more than half a dozen are laid on a single plant, and they hatch in about a week from the time they are laid. The young larva, as soon as hatched, burrows downward within the sheath, leaving a streak of a pale-green color to indicate its path, and, making its way into the root, devours all except the outer skin. When the bulb of the plant has begun to form, several of the larvæ may be found feeding in company in it ; and after it has been consumed, they desert it for another, and still others in succession.

The larvæ reach their full growth in about two weeks. The smaller end, which is the head, is armed with a pair of black, hook-like jaws. The opposite end is cut off obliquely ; and there is a pair of small, brown tubercles near the middle, and eight tooth-like projections around the edge.

The larva usually leaves the onion, and transforms to pupæ in the ground outside. They remain in the pupa state about two weeks in the summer, when the perfect flies emerge ; after pairing, the female deposits her eggs for another generation. The winter is passed in the pupa state ; and the flies emerge in the early part of June, or about the time that the young onions are sufficiently grown to furnish food for the young maggots.

The following preventives and remedies have been suggested : —

Instead of sowing onion seed in rows, where the young seedlings grow in contact, or nearly so, giving every facility for passing from one to another, they should be grown in hills, so that the larvæ cannot make their way from one hill to the other.

Scattering dry, unleached wood-ashes over the beds as soon as the plants are up, while they are wet with dew, and continuing this as often as once a week through the month of June, is said to prevent the deposit of eggs on the plants.

Planting the onions in a new place, as remote as possible from where they were grown the previous year, has been found useful, as the flies are not supposed to migrate very far.

Pulverized gas-lime scattered along between the rows has been found useful in keeping the flies away.

Watering with the liquid from pig-pens, collected in a tank provided for the purpose, was found by Miss Ormerod to be a better preventive than the gas-lime.

It is recommended to run a roller over the ground a few times after the seed has been sown, thus compacting the soil, so that the maggots cannot make their way through it from one plant to another.

Water raised nearly to the boiling point, and poured along the rows from a tea-kettle or other convenient vessel, has proved destructive to the maggots, without injury to the plants. The water should be applied so as to go directly to the bulbs and not to the leaves.

Most excellent results have been obtained in England by growing onions in trenches ; and as the bulbs grew, the earth was worked down upon them so as to keep them buried throughout the season. The onion bulbs should be covered with earth up to the neck, or even higher, so that the fly cannot get at them to lay her eggs.

When the onions have been attacked, and show it by wilting and changing color, they should either be taken up with a trowel and burned, or else a little dilute carbolic acid or kerosene oil should be dropped on the infested plants, to run down around them and destroy the maggots in the root and in the soil around them."

